

What is claimed is:

1. A position/force control device, comprising;
  - (i) position detection means for detecting the position of an object;
  - (ii) driving means for driving the said object;
  - (iii) reaction force detection means for estimating reaction force which the object receives, on the basis of a position signal outputted from the said position detection means and a driving signal applied to the driving means; and
  - (iv) control means for estimating a first acceleration signal from the reaction force which the object undergoes and the goal force signal, and further estimating a second acceleration signal from the position signal and the goal position, and outputting the driving signal to said driving means on the basis of said first and second acceleration signals.
  
2. A position/force control device for controlling the position of the object and force on the object in response to position command signals and force command signals, comprising;
  - (i) driving means for driving the said object;
  - (ii) position detection means for detecting a position of the object;
  - (iii) reaction force detection means for estimating the reaction force undergone by the object from an acceleration signal estimated from a position signal outputted by the position detection means and from a driving signal transmitted to the driving means;
  - (iv) first calculation means for estimating a deviation between a position command signal and a position signal outputted by the position detection means and converting the deviation signal to a first acceleration signal;
  - (v) second calculation means for estimating a deviation between the reaction force detected by the reaction force detection means and a force command signal and converting the deviation signal to a

second acceleration signal; and

(vi) control means for adding the said first and second acceleration signals and outputting the driving signal to the driving means.

3. A position/force control device for controlling positions of an object on a slave side and of an operation part on a master side in response to a position difference between the operation part on the master side and the object on the slave side to drive the object with driving force in response to the operation force on the master side and transmit the reaction force of the slave side to the master side, comprising;

(i) first driving means for driving the operation part on the master side;

(ii) first position detection means for detecting the position of the operation part on the master side;

(iii) first reaction force detection means for estimating reaction force acted on the said operation part from an acceleration signal estimated from a position signal outputted by the first position detection means and from the driving signal transmitted to the said first driving means;

(iv) second driving means for driving the object on the slave side;

(v) second position detection means for detecting the position of the object on the slave side;

(vi) second reaction force detection means for estimating the reaction force undergone by the object from an acceleration signal estimated from the position signal outputted by the said second position detection means and from the driving signal transmitted to the said second driving means;

(vii) first calculation means for estimating a difference between the position signal outputted by the said first position detection means and the position signal outputted by the said second position

detection means and converting the said difference to the first and second acceleration signals for controlling the master side and the slave side;

(viii) second calculation means for estimating the sum of outputs of said first and second reaction force detection means, and converting the said sum to the third and fourth acceleration signals for controlling the master side and the slave side;

(ix) first addition means for adding the said first and third acceleration control signals;

(x) second addition means for adding the said second and fourth acceleration control signals;

(xi) first control means for outputting the driving signal to the operation part on the master side on the basis of the output of the said first addition means; and

(xii) second control means for outputting a driving signal to the object on the slave side on the basis of an output of the said second addition means.